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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,637	02/16/2005	Karsten Plamann	0380-FP6237341	2463
110 7590 09/13/2007 DANN, DORFMAN, HERRELL & SKILLMAN 1601 MARKET STREET SUITE 2400 PHILADELPHIA, PA 19103-2307			EXAMINER TON, TRI T	
			ART UNIT 2877	.PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/501,637

Applicant(s)

PLAMANN ET AL *len*

Examiner

Tri T. Ton

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20, 22, 24 and 25 is/are rejected.
- 7) ☒ Claim(s) 21 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 02/01/07

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's response to amendment filed on 05/30/2007 has been entered.

Claim Objections

2. Claim 21 objected to under 37 CFR 1.75(c) as being in improper form because claim 21 cannot depends on itself.

The examiner respectfully suggests the following revision:

Claim 21, line 1 the word "according to claim 21" should be changed to according to claim 20.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1, 3-14 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greivenkamp, Jr. (U.S. Patent No. 4,794,550) in view of Huntley et al. (U.S. Patent No. 6,208,416). Hereafter, "Greivenkamp" and "Huntley".

Regarding Claim 1, Greivenkamp teaches illuminating the specimen with a illumination pattern (column 1, lines 21-24 and lines 34-38); imaging said specimen on a conjugate image plane (column 1, lines 24-29); acquiring a plurality of signals at respective positions on said image plane (column 2, lines 3-9), each signal corresponding to the incident light intensity at that position and having an oscillatory component caused by the modulation of the illumination pattern (column 2, lines 22-27); measuring a characteristic of the oscillatory component of each of the signals; and generating an optically sectioned image of the specimen by combining the measured characteristics in their relative positions (column 2, lines 3-9).

However, Greivenkamp does not teach temporally modulating the illumination pattern. Huntley teaches the fringe pitch being varied over time (column 1, lines 47-56), (column 2, lines 1-16), (temporally modulating the illumination pattern is not different from fringe pitch being varied over time). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Greivenkamp by temporally modulating the illumination pattern in order to “measure the shape of objects which might have discontinuities using projected fringes, in which the pitch of the fringes is varied over time” (as stated by Huntley, column 1, lines 47-48).

Regarding Claim 3, Greivenkamp teaches between the acquisition and measuring steps, of filtering each acquired signal to isolate the oscillatory component therefrom (column 2, lines 51-58).

Regarding Claim 4, Greivenkamp teaches the illumination pattern being a fringe pattern (column 2, lines 20-24).

Regarding Claim 5, Greivenkamp teaches the fringe pattern being an interference pattern (column 1, lines 64-68).

Regarding Claim 6, Greivenamp teaches the illumination pattern being modulated by moving the illumination pattern relative to the specimen object plane (column 4, lines 47-58).

Regarding Claim 7, Greivenamp teaches the illumination pattern being modulated to produce an illumination modulation frequency of at least 100 Hz (column 6, lines 20-23), ($C/100 - C/1000 \Rightarrow 100 < f < 1000$).

Regarding Claim 8, Greivenamp teaches the incident light at the image plane comprising reflected or transmitted light (column 2, lines 12-14).

Regarding Claim 9, Greivenamp teaches the incident light at the image plane comprising light which being emitted by the specimen in response to the illumination pattern (column 1, lines 51-55, and lines 57-61).

Regarding Claim 10, Greivenamp teaches receiving data which comprising a plurality of signals previously acquired by performing the steps of (i) illuminating a specimen with illumination pattern (column 1, lines 21-24, and lines 34-38), (ii) imaging said specimen on a conjugate image plane (column 1, lines 24-29), and (iii) acquiring a plurality of signals at

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respective positions on said image plane (column 2, lines 3-9), each signal corresponding to the incident light intensity at that position and having an oscillatory component caused by the modulation of the illumination pattern (column 2, lines 22-27), and measuring a characteristic of the oscillatory component of each of the signals, whereby the measured characteristics when combined in their relative positions generate an optically sectioned image of the specimen (column 2, lines 3-9).

However, Greivenkamp does not teach temporally modulating the illumination pattern. Huntley teaches the fringe pitch being varied over time (column 1, lines 47-56), (column 2, lines 1-16), (temporally modulating the illumination pattern is not different from fringe pitch being varied over time). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Greivenkamp by temporally modulating the illumination pattern in order to "measure the shape of objects which might have discontinuities using projected fringes, in which the pitch of the fringes is varied over time" (as stated by Huntley, column 1, lines 47-48).

Regarding Claim 11, Greivenamp teaches illumination means for illuminating a specimen with illumination pattern (column 1, lines 21-24, and lines 34-38); imaging means for imaging said specimen on a conjugate image plane (column 1, lines 24-29); acquisition means for acquiring a plurality of signals at respective positions on said image plane (column 2, lines 3-9), each signal corresponding to the incident light intensity at that position and having an oscillatory component caused by the modulating illumination pattern (column 2, lines 22-27); and processor means for measuring a characteristic of the oscillatory component of each of the signals,

whereby the measured characteristics when combined in their relative positions generate an optically sectioned image of the specimen (column 2, lines 3-9).

However, Greivenkamp does not teach temporally modulating the illumination pattern. Huntley teaches the fringe pitch being varied over time (column 1, lines 47-56), (column 2, lines 1-16), (temporally modulating the illumination pattern is not different from fringe pitch being varied over time). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Greivenkamp by temporally modulating the illumination pattern in order to "measure the shape of objects which might have discontinuities using projected fringes, in which the pitch of the fringes is varied over time" (as stated by Huntley, column 1, lines 47-48).

Regarding Claim 12, Greivenamp teaches the processor means also filtering each acquired signal to isolate the oscillatory component therefrom before measuring the characteristic of the oscillatory component (column 2, lines 51-58).

Regarding Claim 13, Greivenamp teaches the illumination means modulating the illumination pattern to produce a predetermined modulation frequency (column 1, lines 64-68), (column 2, lines 1) and the processor means being adapted to filter the acquired signals at substantially the same frequency (column 2, lines 51-58).

Regarding Claim 14, Greivenamp teaches the illumination means comprises means for generating a spatially periodic interference illumination pattern (column 1, lines 64-68).

Regarding Claim 17, Greivenamp teaches the processor means comprising a plurality of signal processors for respectively measuring the characteristics of the oscillatory components of the acquired light signals (column 2, lines 3-9).

Regarding Claim 18, Greivenamp teaches illumination means modulates the illumination pattern so that the modulation frequency is at least 100 Hz (column 6, lines 20-23), ($C/100 - C/1000 \Rightarrow 100 < f < 1000$).

Regarding Claim 19, Greivenamp teaches illumination means for illuminating a specimen with illumination pattern (column 1, lines 21-24, lines 34-38); acquisition means for acquiring a plurality of signals at respective positions on a conjugate image plane onto which the microscope images the specimen (column 2, lines 3-9), (column 1, lines 24-29), each signal corresponding to the incident light intensity at that position and having an oscillatory component caused by the modulating illumination pattern (column 2, lines 22-27), and processor means for measuring a characteristic of the oscillatory components of each of the signals, whereby the measured characteristics when combined in their relative positions generate an optically sectioned image of the specimen (column 2, lines 3-9).

However, Greivenkamp does not teach temporally modulating the illumination pattern. Huntley teaches the fringe pitch being varied over time (column 1, lines 47-56), (column 2, lines 1-16), (temporally modulating the illumination pattern is not different from fringe pitch being varied over time). It would have been obvious to one having ordinary skill in the art at the time

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of the invention was made to modify Greivenkamp by temporally modulating the illumination pattern in order to "measure the shape of objects which might have discontinuities using projected fringes, in which the pitch of the fringes is varied over time" (as stated by Huntley, column 1, lines 47-48).

Regarding Claims 22, and 24, Greivenamp teaches the filtering step is performed without sampling the modulation frequency of the illumination pattern (column 3, lines 49-51).

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greivenkamp, Jr. (U.S. Patent No. 4,794,550) in view of Huntley et al. (U.S. Patent No. 6,208,416), and further in view of Hutchin (U.S. Patent No. 4,584,484). Hereafter, "Greivenkamp", "Huntley" and "Hutchin".

Regarding Claim 2, Greivenkamp and Huntley teach all the limitations of claim 1 as stated above except for the measured characteristic being the amplitude of the oscillatory component. Hutchin teaches the measured characteristic being the amplitude of the oscillatory component (column 1, lines 12-15, lines 67-68), (column 2, lines 1-8). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Greivenkamp and Huntley by adding the measured characteristic being the amplitude of the oscillatory component in order to carry out for producing data which employed in reconstructing an optical image of the sample.

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6. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greivenkamp, Jr. (U.S. Patent No. 4,794,550) in view of Huntley et al. (U.S. Patent No. 6,208,416), and further in view of De Groot (U.S. Patent No. 5,598,265). Hereafter, "Greivenkamp", "Huntley", and "Groot".

Regarding Claim 15, Greivenkamp and Huntley teach all the limitations of claim 1 as stated above except for the acquisition means comprising an array of light detectors for respectively detecting the light intensities at the plurality of image plane positions. Hutchin teaches an array of light detectors for detecting the light intensities at the plurality of image plane positions (column 9, lines 14-23). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Greivenkamp and Huntley by adding an array of light detectors for detecting the light intensities in order to using the result of the intensity variation as a function of scan position for generating the image for the specimen.

Regarding Claim 16, Greivenkamp teaches the array of light detectors is a two-dimensional array (Figure 4), (column 3, lines 4-7).

7. Claims 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greivenkamp, Jr. (U.S. Patent No. 4,794,550) in view of Huntley et al. (U.S. Patent No. 6,208,416), and further in view of Shirley (U.S. Patent No. 6,690,474). Hereafter, "Greivenkamp", "Huntley", and "Shirley".

Regarding Claim 20, Greivenkamp and Huntley teach all the limitations of claims 1, and 3 as stated above except for plurality of signal processors. Shirley teaches plurality of signal

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processors (column 8, lines 7-8). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Greivenkamp and Huntley by adding an plurality of signal processors in order to “compute on signals from a plurality of individual photoelements occur substantially simultaneously”.

Regarding Claim 21, Greivenkamp and Huntley teach all the limitations of claim 11 as stated above except for the amplitude of the oscillatory component. Shirley teaches the amplitude of the oscillatory component (column 39, lines 45-49). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Greivenkamp and Huntley by having the amplitude of the oscillatory component in order to modulate the sensitivity of detector to observe the fringe pattern.

Allowable Subject Matter

8. Claims 21 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and overcome the objection(s), set forth in this Office action.

9. The following is a statement of reasons for the indication of allowable subject matter: No prior art found by the examiner that suggested modification or combination with the cited art so as to satisfy the combination of all the limitations in claims 21 and 23.

10. As to claims 21, and 23, the prior art of record taken alone or in combination, fails to disclose or render obvious “the feedback loop rejecting a time-invariant component of the

respective acquired signal and amplifying the oscillatory component of that signal.” in

combination with the rest of the limitations of claims 1, 3, 20, 21 and 11, 17, 23.

Response to Arguments

11. Applicant's arguments, see pages 7-14, filed on 05/30/07, with respect to the rejection(s) of claims 1-19 under 102 (b) and 103(a) have been fully considered but are not persuasive.

12. Examiner respectfully traverses the Applicant's argument on page 9. The Applicant's process cannot generate the sectioned image, which can display the inside details of an object. The Applicant's process can only image or generate the outside image of the body of an object. Therefore, the examiner disagrees with the Applicant's argument on page 9.

13. With respect to the rejection(s) of claim(s) 1-9 under Rejection – 35 USC 101 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

14. With respect to applicant's remarks regarding rejected claims 1, 10, and 11, although Greivenkamp does not teach temporally modulating the illumination pattern. Huntley teaches the fringe pitch being varied over time (column 1, lines 47-56), (column 2, lines 1-16), (temporally modulating the illumination pattern is not different from fringe pitch being varied over time). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Greivenkamp by temporally modulating the illumination pattern in order to “measure the shape of objects which might have discontinuities using projected fringes, in which the pitch of the fringes is varied over time” (as stated by Huntley, column 1, lines 47-48).

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15. As to dependent claims 2-9, 12-19, these claims should not be withdrawn from this rejection due to the rejection of claims 1, and 11.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references of Greivenkamp, Jr. (U.S. Patent No. 4,794,550), Hutchin (U.S. Patent No. 4,584,484), De Groot (U.S. Patent No. 5,598,265), Huntley et al. (U.S. Patent No. 6,208,416), and Shirley (U.S. Patent No. 6,690,474) teach of various features similar to the claimed invention.

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tri T. Ton whose telephone number is (571) 272-9064. The examiner can normally be reached on 10:30am - 7:00pm.

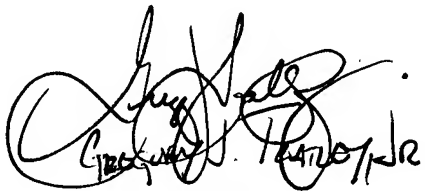
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



August 15, 2007
Examiner Tri Ton/SN



Art Unit 2877
Technology Center 2800

Gregory J. Tooley, Jr.
Supervisory Patent Examiner